

**Finance Management**  
**Problems of 2<sup>nd</sup> Term**

**Example (5-1)**

A preferred stock \$10 par value, 10% dividend (this amount is fixed) what is the value of the share if the required rate of return is equal 11%.

**Answer:**

$$\text{Value} = \frac{\text{Dividends}}{\text{RRR}}$$

$$\text{Value } P_s = \frac{10 \times 10\%}{0.11} = \frac{1}{0.11} = \$ 9.09$$

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**Example (5-2)**

Fee Founders Has Preferred Stock Outstanding Which Pays A Dividend Of \$5 At The End Of Each Year. The Preferred Stock Sells For \$60 A Share. What Is the Preferred Stock's Required Rate of Return?

**Answer:**

$$\text{Value} = \frac{\text{Dividends}}{\text{RRR}}$$

$$60 = \frac{\$5}{\text{RRR}} =$$

$$\text{RRR} = \frac{5}{60} \times 100 = 8.33\%$$

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**Example (5-3)**

What will be the nominal rate of return on a preferred stock with a \$100 par value, a stated dividend of 8 percent of par, and a current market price of (a) \$60, (b) \$80, (c) \$100, and (d) \$140?

**Answer:**

$$\text{Dividend} = 100 \times 8\% = \$8$$

$$\text{Value} = \frac{\text{Dividends}}{\text{RRR}}$$

$$\text{A) - RRR @ \$60} = \frac{8 \times 100}{60} = 13.33\%$$

$$\text{B) - RRR @ \$80} = \frac{8 \times 100}{80} = 10\%$$

$$\text{C) - RRR @ \$100} = \frac{8 \times 100}{100} = 8\%$$

$$\text{D) - RRR @ \$140} = \frac{8 \times 100}{140} = 5.71\%$$

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#### Example (5-4)

Ezzell Corporation issued preferred stock with a stated dividend of 10 percent of par. Preferred stock of this type currently yields 8 percent, and the par value is \$100. Assume dividends are paid annually.

A. What is the value of Ezzell's preferred stock?

B. Suppose interest rate levels rise to the point where the preferred stock now yields 12 percent. What would be the value of Ezzell's preferred stock?

**Answer:**

$$\text{Dividend} = 100 \times 10\% = \$10$$

$$\text{Value} = \frac{\text{Dividends}}{\text{RRR}}$$

$$P = \frac{10}{0.08} = \$125$$

$$P = \frac{10}{0.12} = \$83.33$$

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#### Example (5-5)

XYZ Company has a share that is expecting to pay \$1 dividend next year and to be sold at \$30 by the end of that year, what is the value of XYZ stock if the required rate of return is 14%.

**Answer:**

Today  $\longrightarrow$  Dividend ( $D_1$ ) = \$ 1

Selling price = \$ 30

FV  $\qquad \qquad \qquad$  \$ 31

$$\text{Price (PV)} = \frac{\text{FV}}{1 + \text{RRR}}$$

$$\text{Price (PV)} = \frac{31}{1.14} = \$27.19$$

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#### Example (5-6)

ABC's share is expecting to pay \$2 dividend next year while the dividends of this stock will grow by 10% each year, ABC Share is expected to be sold at the end of 3 years for amount of \$40, what is the value of ABC stock if the required rate of return is 14%.

**Answer:**

$Y_0$	$Y_1$	$Y_2$	$Y_3$
Dividend	2 $\xrightarrow{10\%}$	2.20 $\xrightarrow{10\%}$	2.42
Selling Price			40
<b>Total</b>	<b>2</b>	<b>2.20</b>	<b>42.42</b>

$$\text{Price (PV)} = \frac{2}{1.14} + \frac{2.20}{(1.14)^2} + \frac{42.42}{(1.14)^3} =$$

$$\text{Price (PV)} = 1.7544 + 1.6928 + 28.6331 = \$32.08$$

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**Example (5-7)**

ABC's share is expecting to pay \$ 3 dividends next year while it is expected to have a constant growth rate for 5 %, what is the value of ABC stock if the required rate of return is 15%.

**Answer**

$$\text{Value} = \frac{\text{Dividends}}{\text{RRR}-g} = P_0 = \frac{D_1}{\text{RRR}-g}$$

$g \rightarrow$  Growth rate

$$V = \frac{3}{0.15-0.05} = \$ 30$$

**Example (5-8)**

ABC's share is expecting to pay \$ 2 dividends next year while it is expected to have a constant growth rate for 10 % annually for the coming 2 years then it will fall to 4 % constantly, what is the value of ABC stock if the required rate of return is 14%.

**Answer :**

$Y_0$	Y1	Y2	Y3	Y4
Dividend	2	2.20	2.42	2.52
	10%	10%	4%	Constant Growth
Selling Price			25.20	
<b>Total</b>	<b>2</b>	<b>2.20</b>	<b>27.62</b>	

$$P_3 = \frac{D_4}{\text{RRR}-g}$$

$$P_3 = \frac{2.52}{0.14-0.04} = \$ 25.20$$

$$\text{Price (PV)} = \frac{2}{1.14} + \frac{2.20}{(1.14)^2} + \frac{27.62}{(1.14)^3} =$$

$$\text{Price (PV)} = 1.75 + 1.69 + 18.64 = \$ 22.08$$

**Example (5-9)**

The records of ABC Company showing the following Data

Item	Amount
Sales	100 Million
Cost of Goods Sold (COGS)	50 Million
Book Value of ABC Share	\$ 10
Interest rate on Co's Debt	15%
Tax Rate	40%
Amount Of Debt	40 Million
No. of outstanding Shares	4 Million Shares
Risk Free Rate	10%
Market Risk Premium	25%

Beta	1.20
Payout Ratio	40%
The company is 50% Financed by Debt & 50% Equity	

From the given data, Please find the following:-

- The Required Rate of Return
- What is the Stock Value?

**Answer :**

$$P_0 = \frac{D_1}{RRR-g}$$

$$RRR = RFR + (\text{Market Risk Premium}) \times \text{Beta}$$

$$RRR = 10\% + 25\% \times 1.20 = 40\%$$

In order to get the stock value we need to calculate g & D<sub>1</sub>

Sales	100,000,000
(-) COGS	50,000,000
<b>EBIT</b>	<b>50,000,000</b>
(-) Interest (40,000,000 X 15% )	(-) <b>6,000,000</b>
<b>EBT</b>	44,000,000
(-) Tax @ 40%	(-) <b>17,600,000</b>
<b>Net Income After Tax</b>	<b>26,400,000</b>

Retention Rate (60%)  
15,840,000

Pay Out Ratio (40%)  
10,560,000 ÷  
4,000,000 Shares  
Dividend (D<sub>0</sub>) = 2.64

$$g = RR \times ROE$$

$$ROE = \frac{\text{Net Income}}{\text{Equity}} \times 100$$

$$ROE = \frac{26,400,000}{40,000,000} \times 100 = 66\%$$

$$g = RR \times ROE$$

$$g = 60\% \times 66\% = 39.60\%$$

$$D_1 = D_0 \times (1+g)$$

$$D_1 = 2.64 \times (1.3960) = 3.69$$

$$P_0 = \frac{D_1}{RRR-g}$$

$$D_1 = 3.69$$

$$RRR = 40\%$$

$$g = 39.60\%$$

$$P_0 = \frac{3.99}{0.4000 - 0.3960} = \frac{3.69}{0.004} = \$ 92.25$$

**Example (5-10)**

The Record of **TATA** Industrial Company Showing the Following data:-

Sales Volume in Units	: 10,000,000 Units
Selling Price per Unit	: \$3
Variable Cost per Unit	: \$1
Total Fixed Cost	: \$ 1,000,000
Fixed Assets	: \$ 2,000,000
Depreciation Rate of Fixed Assets	: 5% per Annum
Risk Free Rate (RFR)	: 12%
Market Required Rate of Return	: 20%
Beta	: 1.20
Long Term Debt	: \$ 5,000,000 @ Interest Rate 15%
Number of Outstanding Shares	: 1,000,000 Shares
Share Price (Book Value)	: \$30
Tax Rate	: 35%
Payout Ratio	: 50%

**From the Above Mentioned Data, Find the Following:-**

1. Sales Revenue in Dollars
2. Total cost **COGS**= (Variable + Fixed + Depreciations)
3. Earnings Before Interest and tax (**EBIT**)
4. Return on Equity (**ROE**)
5. Required Rate of Return (**RRR**)
6. Dividend for Current Year (**D<sub>0</sub>**)
7. Calculate Growth Rate (**g**)
8. Dividend For Next Year (**D<sub>1</sub>**)
9. Find the Value of ABC Share
10. If Share is traded in the stock Market at \$250, what is your decision as investor and why?

**Answer:**

$$RRR = RFR + (R_M - RFR) \times \text{Beta}$$

$$RRR = 12 + (20 - 12)1.20 = 21.60\%$$

$$\text{Sales} = \text{no. of units} \times \text{Selling Price}$$

$$\text{Sales} = 10 \text{ Million} \times 3 = 30 \text{ Million}$$

$$\text{Variable cost} = \text{No. of Units} \times \text{Variable cost Per Unit}$$

$$\text{Variable Cost} = 10 \text{ Million} \times 1 = 10 \text{ Million}$$

$$\text{Depreciation} = \text{Fixed Assets} \times \text{Deprecation Rate}$$

**Depreciation** = 2Million X 5% = 100,000

Total cost **COGS**= (Variable + Fixed Cost + Depreciations)

**COGS** = 10M+1M+100,000 = 11,100,000

Sales	30,000,000
(-) COGS	11,100,000
<b>EBIT</b>	<b>18,900,000</b>
(-) Interest (5,000,000 X 15% )	(-) <b>750,000</b>
<b>EBT</b>	<b>18,150,000</b>
(-) Tax @ 35%	(-) <b>6,352,500</b>
<b>Net Income After Tax</b>	<b>11,797,500</b>

Retention Rate (50%)  
5,898,750

Pay Out Ratio (50%)  
5,898,750 ÷  
1,000,000 Shares  
Dividend ( $D_0$ ) = 5.90

$$g = RR \times ROE$$

$$ROE = \frac{\text{Net Income}}{\text{Equity}} \times 100$$

$$\text{Equity} = 1,000,000 \times 30 = 30,000,000$$

$$ROE = \frac{11,797,0000}{30,000,000} \times 100 = 39.32\%$$

$$g = RR \times ROE$$

$$g = 50\% \times 39.32\% = 19.66\%$$

$$D_1 = D_0 \times (1+g)$$

$$D_1 = 5.90 \times (1.1966) = 7.06$$

$$P_0 = \frac{D_1}{RRR-g}$$

$$D_1 = 7.06$$

$$RRR = 21.60\%$$

$$g = 19.66\%$$

$$P_0 = \frac{7.06}{0.2160 - 0.1966} = \frac{7.06}{0.0194} = \$ 363.92$$

Since the Fair value of the stock is approximately is \$364 while it is traded at \$250 ( Under Price) , Therefore my decision as investor is to purchase TATA stock as its has a potential to move up to \$ 364 and achieve capital gain .

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### Example (6-1)

ABC Company issued a bond with face value for \$1000, paid annual 10% coupon and 3 years to maturity, what is the value of ABC bonds today if the required rate of return is 12%.

**Answer:**

$$\text{Coupon} = 1000 \times 10\% = \$100$$

$$PV = \frac{100}{(1.12)^1} + \frac{100}{(1.12)^2} + \frac{100}{(1.12)^3} + \frac{1000}{(1.12)^3}$$

**Ordinary Annuity table**

Interest = 12% & N= 3

**PV table**

Interest = 12% & N= 3

$$PV = 100 \times 2.40183 + 1000 \times 0.71178 =$$

$$PV = 240.18 + 711.78 = \mathbf{951.96 \approx \$952}$$

**Suppose that maturity date is only 2 Years, what will be the value of ABC bond?**

$$PV = \frac{100}{(1.12)^1} + \frac{100}{(1.12)^2} + \frac{1000}{(1.12)^2}$$

**Ordinary Annuity Table**

Interest = 12% & N= 2

**PV Table**

Interest = 12% & N= 2

$$PV = 100 \times 1.69005 + 1000 \times 0.79719$$

$$PV = 169 + 797.19 = \mathbf{\$966.19 \approx \$966}$$

**Suppose that maturity date is only 1 Year, what will be the value of ABC bond?**

$$PV = \frac{1100}{1.12} = \mathbf{982.14 \approx 982}$$

**Suppose that maturity date is only 3 Years, but required rate of return is 8%, what will be the value of ABC bond?**

$$PV = \frac{100}{(1.08)^1} + \frac{100}{(1.08)^2} + \frac{100}{(1.08)^3} + \frac{1000}{(1.08)^3}$$

**Ordinary Annuity table**

Interest = 8% & N= 3

**PV table**

Interest = 8% & N= 3

$$PV = 100 \times 2.57710 + 1000 \times 0.79383$$

$$PV = 257.71 + 793.83 = \$ 1051.54 \approx 1052$$

**Suppose that maturity date is only 2 Years, but required rate of return is 8%, what will be the value of ABC bond?**

$$PV = \frac{100}{(1.08)^1} + \frac{100}{(1.08)^2} + \frac{1000}{(1.08)^2}$$

**Ordinary Annuity table**

Interest = 8% & N= 2

**PV table**

Interest = 8% & N= 2

$$PV = 100 \times 1.78326 + 1000 \times 0.85734$$

$$PV = 178.33 + 857.34 = \$ 1035.67 \approx 1036$$

**Suppose that maturity date is only 1 Year, but required rate of return is 8%, what will be the value of ABC bond?**

$$PV = \frac{1100}{1.08} = \$ 1018.52 \approx 1019$$

**When the RRR Decreased Value of the Bond Increased**

Required Rate of Return \ Years	RRR @ 12%	RRR @ 8%
3	952	1052
2	966	1036
1	982 (+)	1019 (-)
When we are approaching maturity date, The value of the bond will approach its Face Value		

### Example (6-2)

ABC Company issued a bond with face value for \$1000, Zero coupon and 5 years to maturity, what is the value of ABC bonds today if the required rate of return is 12%.

**Answer:**

$$PV = \frac{1000}{(1.12)^5} = 1000 \times 0.56743 = \$ 567.43$$

### Example (6-3)

ABC Company issued a bond with face value for \$1000, 6% **Semi Annual Coupon** and 2 years to maturity, what is the value of ABC bonds today if the required rate of return is 8%.

**Answer:**

$$\text{Coupon} = 1000 \times 6\% \times \frac{1}{2} = \$ 30$$

$$\text{RRR (Semi Annual)} = 8 \div 2 = 4\%$$

$$\text{PV} = \underbrace{\frac{30}{(1.04)^1} + \frac{30}{(1.04)^2} + \frac{30}{(1.04)^3} + \frac{30}{(1.04)^4}} + \underbrace{\frac{1000}{(1.04)^4}}$$

#### Ordinary Annuity Table

Interest = 4% & N= 4

$$\text{PV} = 30 \times 3.62990 + 1000 \times 0.85480$$

#### PV Table

Interest = 4% & N= 4

$$\text{PV} = 108.90 + 854.80 = \$ 963.70$$

### Bond Yield to Maturity (YTM)

YTM is the rate of return earned on a bond held to maturity. Also called “promised yield.”

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### Example (6-4)

14 Years bond, 10% Coupon, \$ 1000 par value, bond price at \$1494.93 what is rate of interest would you earn on your investment if you held the bond till maturity?

**Answer:**

$$1494.93 = \frac{100}{(1+r)^1} + \frac{100}{(1+r)^2} + \dots + \frac{100}{(1+r)^{14}} + \frac{1000}{(1+r)^{14}}$$

We use trail & error or Financial Calculator we reach to 5%

### To proof the Result

$$100 \times 9.89864 + 1000 \times 0.50507$$

$$989.86 + 505.07 = \$ 1494.93 \text{ (Which is equal to bond price)}$$

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### Example (6-5)

A bond currently sells at \$ 985 and pay a coupon 10% and Face value = 1000 what is the current yield?

**Answer:**

$$\text{Current yield} = \frac{100}{985} \times 100 = 10.15\%$$

### Example (6-6)

Heath Foods' bonds have 7 years remaining to maturity. The bonds have a face value of \$1,000 and a yield to maturity of 8 percent. They pay interest annually and have a 9 percent coupon rate. What is their current yield?

**Answer:**

$$PV = \frac{90}{(1.08)^1} + \frac{90}{(1.08)^2} + \dots + \frac{90}{(1.08)^7} + \frac{1000}{(1.08)^7}$$

**Ordinary Annuity Table**

Interest = 8% & N= 7

**PV Table**

Interest = 8% & N= 7

$$PV = 90 \times 5.20637 + 1000 \times 0.58349$$

$$PV = 468.57 + 583.49 = \$ 1052.06$$

$$\text{Current Yield} = \frac{90}{1052.06} \times 100 = 8.55\%$$

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### Example (6-7)

Callaghan Motors' bonds have 12 years remaining to maturity. Interest is paid annually, the bonds have a \$1,000 par value, and the coupon interest rate is 8 Percent. The bonds have a yield to maturity of 9 Percent. What is the current market price of these bonds?

**Answer:**

$$\text{Coupon} = 1000 \times 8\% = \$ 80$$

$$PV = \frac{80}{(1.09)^1} + \frac{80}{(1.09)^2} + \dots + \frac{80}{(1.09)^{12}} + \frac{1000}{(1.09)^{12}}$$

**Ordinary Annuity Table**

Interest = 9% & N= 12

**PV Table**

Interest = 9% & N= 12

$$PV = 80 \times 7.16073 + 1000 \times 0.35553$$

$$PV = 572.86 + 355.53 = \$ 928.39$$

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### Example (6-8)

Suppose Ford Motor Company sold an issue of bonds with a 10-year maturity, a \$1,000 par value, a 10 percent coupon rate, and **Semiannual interest** payments.

A. Two years after the bonds were issued, the going rate of interest on bonds such as these fell to 6 percent.

At what price would the bonds sell?

B. Suppose that, 2 years after the initial offering, the going interest rate had risen to 12 percent. At what price would the bonds sell?

**Answer:**

$$\text{Coupon} = 1000 \times 10\% \times \frac{1}{2} = \$ 50$$

$$\text{Remaining Years till Maturity} = 10 - 2 = 8 \text{ years} = 8 \times 2 = 16 \text{ period}$$

$$\text{Interest (Paid Semi Annual)} = 6 \div 2 = 3 \%$$

**A)-**

$$PV = \frac{50}{(1.03)^1} + \frac{50}{(1.03)^2} + \dots + \frac{50}{(1.03)^{16}} + \frac{1000}{(1.03)^{16}}$$

**Ordinary Annuity Table**

Interest = 3% & N= 16

**PV Table**

Interest = 3% & N= 16

$$\begin{aligned} PV &= 50 \times 12.56110 + 1000 \times 0.62317 \\ PV &= 628.06 + 623.17 = \$ 1251.23 \end{aligned}$$

**B) - Interest** (Paid Semi Annual) =  $12 \div 2 = 6 \%$

$$PV = \frac{50}{(1.06)^1} + \frac{50}{(1.06)^2} + \dots + \frac{50}{(1.06)^{16}} + \frac{1000}{(1.06)^{16}}$$

**Ordinary Annuity Table**

Interest = 6% & N= 16

**PV Table**

Interest = 6% & N= 16

$$PV = 50 \times 10.1059 + 1000 \times 0.39365$$

$$PV = 505.30 + 393.65 = \$ 898.95$$


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### Example (7-1)

Calculate the after-tax cost of debt under each of the following conditions:

- a. Interest rate, 13 percent; tax rate, 0 percent.
- b. Interest rate, 13 percent; tax rate, 20 percent.
- c. Interest rate, 13 percent; tax rate, 35 percent.

**Answer:**

A- Interest rate  $\times (1 - \text{Tax rate}) = 13 \% (1 - 0) = 13.00\%$ .

B-  $= 13 \% (0.80) = 10.40\%$ .

C-  $= 13 \% (0.65) = 8.45\%$ .

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### Example 7-(2)

The Heuser Company's currently outstanding 10 percent coupon bonds have a yield to maturity of 12 percent. Heuser believes it could issue at par new bonds that would provide a similar yield to maturity. If its marginal tax rate is 35 percent, what is Heuser's after-tax cost of debt?

**Answer:**

Cost of Debt = Debt  $(1 - \text{tax rate})$

$$12\% \times (1 - 0.35) = 7.80\%$$

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### Example (7-3)

LL Incorporated's currently outstanding 11% coupon bonds have a yield to maturity of 8% LL believes it could issue at par new bonds that would provide a similar yield to maturity. If its marginal tax rate is 35%, what is LL's after-tax cost of debt?

**Answer:**

Cost of Debt = Debt  $(1 - \text{tax rate})$

$$= 8\% \times 0.65 = 5.20\%$$

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### Example (7-4)

ABC Company issued \$50 Million shares, par value worth for \$10 dollars, if the fixed dividends are 9% what is the cost of the preferred stock? If the issuing process cost the company \$ 2 Million

**Answer:**

Dividends =  $50,000,000 \times 9\% = \$ 4,500,000$

Net Proceeds =  $50,000,000 - 2,000,000 = \$ 48,000,000$

Cost of preferred Stock =  $\frac{4,500,000}{48,000,000} \times 100 = 9.38 \%$

### Example (7-5)

ABC Company issued 100 Million shares; par value worth for \$5 dollars, if the expected Dividends are 10% and growth rate on those dividends is 6%, if the issuing cost is \$40 Million, what is the cost of common stock?

**Answer:**

$$\text{Dividends} = 100,000,000 \times 5 \times 10\% = \$ 50,000,000$$

$$\text{Net Proceeds} = 100,000,000 \times 5 - 40,000,000 = (500,000,000 - 40,000,000) = \$ 460,000,000$$

$$\begin{aligned}\text{Cost of Common Stock} &= \frac{D_1}{P_0} + g \\ &= \frac{50,000,000}{460,000,000} \times 100 + 6\% \\ &= 10.87\% + 6\% = 16.87\%\end{aligned}$$

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### Example (7-6)

NCC's stock sells for \$32, its next expected dividend is \$2.40, and its expected growth rate is 7 %, what is the cost of common stock.

**Answer:**

$$\text{Cost of Common Stock} = \frac{D_1}{P_0} + g$$

$$R_s = \frac{2.40}{32} \times 100 + 7\%$$

$$R_s = 7.50 + 7\% = 14.50$$

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### Example (7-7)

ABC Company Has Total Investment worth for \$200 Million financed as follows:-

- 100 Million Common stock @15 % cost
- 60 Million Preferred stock @ 12% cost
- 40 Million Debt @ 10% cost – Tax rate 20% what is the WACC?

**Answer:**

**Weight**

Common	100,000,000	50%
Preferred	60,000,000	30%
Debt	40,000,000	20%
	=====	=====
Total	200,000,000	100%

$$\text{WACC} = (50\% \times 15\%) + (30\% \times 12\%) + 20\% \left[ 10\% (1 - 20\%) \right]$$

$$\text{WACC} = 7.50\% + 3.60\% + 1.60\% = 12.70\%$$

### Example (7-8)

Longstreet Communications Inc. (LCI) has the following capital structure, which it considers to be optimal: **Debt 25%, Preferred Stock, 15%, and Common Stock 60%**. LCI's tax rate is 40% and investors expect earnings and dividends to grow at a constant rate of 6% in the future. LCI paid a dividend of \$3.70 per share last year ( $D_0$ ) and its stock currently sells at a price of \$60 per share. Treasury bonds yield 6%, The Market Risk Premium is 5%, and LCI's beta is 1.3 these terms would apply to new security offerings.

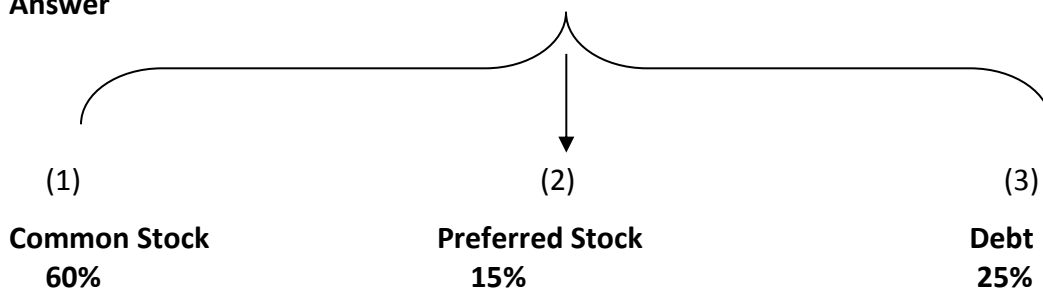
**Preferred:** New preferred could be sold to the public at a price of \$100 per share, with a dividend of \$9. Flotation costs of \$5 per share would be incurred.

**Debt:** Debt could be sold at an interest rate of 9%.

A. Find the component costs of debt, preferred stock, and common stock. Assume LCI does not have to issue any additional shares of common stock.

B. What is the WACC?

**Answer**



$g = 6\%$   
 $D_0 = 3.70$   
 $P_0 = 60$

#### 1. Calculation for Common Stock

##### A. According DCF

$$\text{Cost of Common Stock} - R_s = \frac{D_1}{P_0} + g$$

$$D_1 = D_0 \times (1+g)$$

$$D_1 = 3.70 \times 1.06 = 3.92$$

$$R_s = \frac{3.92}{60} \times 100 + 6\%$$

$$R_s = 6.53\% + 6\% = 12.53\%$$

##### B. According to CAPM

$$R_s = RFR + (R_M - RFR) \text{ beta}$$

**Risk Premium**

$$R_s = 6\% + 5\% \times 1.30 = 12.50\%$$

## 2. Preferred Stock

$$\text{Cost of Preferred Stock} = \frac{\text{Dividend}}{\text{Net Proceed}}$$

$$R_{PS} = \frac{9}{100-5} \times 100 = 9.47\%$$

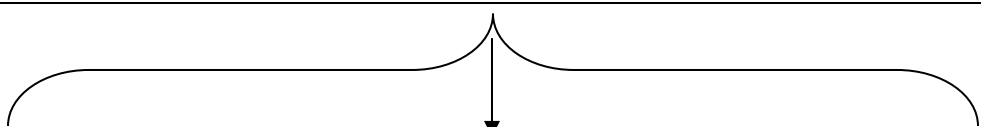
## 3. Debt

$$\text{Cost of debt} = \text{interest} (1 - \text{Tax Rate})$$

$$R_D = 9\% \times (1 - 0.40) = 5.40\%$$

### WACC =

$$(\text{Weight of debt} \times \text{Cost Debt}) + (\text{Weight of Preferred Stock} \times \text{Cost of Preferred Stock}) + (\text{Weight of Common Stock} \times \text{Cost of Common Stock})$$



	Common Stock	Preferred Stock	Debt
Weight	60%	15%	25%
Cost	12.53%	9.47%	5.40%

$$\text{WACC} = (25\% \times 5.40\%) + (15\% \times 9.47\%) + (60\% \times 12.53\%)$$

$$\text{WACC} = 1.35\% + 1.42\% + 7.52\%$$

$$\text{WACC} = 10.29\%$$

### Example (7-9)

On January 1, the total market value of the Tysseland Company was \$60 Million. During the year, The Company plans to raise and invest **\$30 Million in New Projects**. The firm's Present Market value Capital Structure, Shown below, is considered to be optimal. Assume that there is no short-term debt.

Debt	\$30,000,000
Common equity	<u>\$30,000,000</u>
Total Capital	\$60,000,000

New bonds will have an 8 % coupon rate, and they will be sold at par. Common stock is currently selling at \$30 a share. Stockholders' required rate of return is estimated to be 12 percent, consisting of a dividend yield of 4

percent and an expected constant growth rate of 8 percent. (The next expected dividend is \$1.20, so  $\$1.20/\$30 = 4\%$ .) The corporate tax rate is 40 %.

A. To maintain the Present capital structure, how much of the new investment must be financed by common equity?

B. Assume that there is sufficient cash flow such that Tyseland can maintain its target capital structure without issuing additional shares of equity. What is the WACC?

**Answer:**

**A)** - In order to keep same percentage of the capital structure (which is 50% & 50%); we need to divide the new \$ 30 Million between Equity & Debt with same Percentage. So

New investment must be financed by common Equity = 30 Million X 0.50 = \$ 15 Million

**B)-**

$$P_0 = 30$$

$$g = 8\%$$

$$D_1 = 1.20$$

$$\text{Tax} = 40\%$$

$$\text{Bond Coupon} = 8\%$$

$\text{Cost of Common Stock } R_s = \frac{D_1}{P_0} + g$
--

$$R_s = \frac{1.20}{30} \times 100 + 8\% = 4\% + 8\% = 12\%$$

$$\text{Cost Of Debt} = 8\% (1 - 0.40\%) = 4.80\%$$

$$\text{WACC} = (50\% \times 12\%) + (50\% \times 4.80\%)$$

$$\text{WACC} = 6\% + 2.40\% = 8.40\%$$

**Example (8-1)**

	<b>Good Year</b>	<b>Bad Year</b>
Price	\$2.00	\$2.00
Variable costs	\$1.50	\$1.00
Fixed costs	\$20,000	\$60,000
Capital	\$200,000	\$200,000
Tax rate	40%	40%

Calculate Break Even Point in the two scenarios.

**Answer:**

**1- Good Year**

$$Q_{BE} = \frac{FC}{P-V}$$

$$Q_{BE} = \frac{20,000}{2-1.50} = 40,000$$

**2- Bad Year**

$$Q_{BE} = \frac{60,000}{2-1} = 60,000$$

	<b>Good Year</b>	<b>Bad Year</b>
<b>Sales @ Break Even</b>	80,000	120,000
<b>(-) VC</b>	60,000	60,000
<b>(-)FC</b>	20,000	60,000
<b>EBIT</b>	ZERO	ZERO

**The higher the operating leverage the higher the business risk**

### Example (8-2)

Schweser Satellites Inc. produces satellite earth stations that sell for \$100,000 each. The firm's fixed costs, F, are \$2 million; 50 earth stations are produced and sold each year; profits total \$500,000; and the firm's assets (all equity financed) are \$5 million. The firm estimates that it can change its production process, adding \$4 million to investment and \$500,000 to fixed operating costs. This change will

(1) Reduce variable costs per unit by \$10,000

(2) increase output by 20 units

(3) But the sales price on all units will have to be lowered to \$95,000 to permit sales of the additional output.

The firm has tax loss carry-forwards that cause its tax rate to be zero, its cost of equity is 15 percent, and it uses no debt.

**A.** Should the firm make the change?

**B.** Would the firm's operating leverage increase or decrease if it made the change?

What about its breakeven point?

**A.** Would the new situation expose the firm to more or less business risk than the old one?

**Answer**

	Old	New
Assets	5,000,000	9,000,000
Fixed Cost	2,000,000	2,500,000
VC	?	Reduction (10,000)
No. of Units	50	70
Price per Unit	100,000	95,000

**(A)**

**Determine the variable cost per unit at present, V:**

$$\text{Profit} = \text{Sales} - (\text{FC} + \text{VC})$$

$$\$500,000 = (\$100,000)(50) - (\$2,000,000 + V(50))$$

$$50(V) = \$2,500,000$$

$$\text{VC Per unit} = \$50,000$$

$$\text{VC for New} = 50,000 - 10,000 = 40,000$$

**(2) Determine the new profit level if the change is made:**

$$\text{New profit} = \text{Sales} - (\text{FC} + \text{VC})$$

$$= \$95,000(70) - (\$2,500,000 + 40,000 \times 70)$$

$$= \$1,350,000$$

**(3) Determine the change in Profit (incremental profit)**

$$\text{Profit} = \$1,350,000 - \$500,000 = \$850,000$$

**Estimate the approximate rate of return on new investment:**

$$\text{Return} = \text{Profit} / \text{Investment} =$$

$$\$850,000 / \$4,000,000 = 21.25\%$$

Since the return exceeds the 15 % cost of equity, this analysis suggests that the firm should go ahead with the change.

$$\text{Return} > \text{WACC } 21.25\% > 15\%$$

**(B)**

The change would increase the breakeven point:

$$\text{Old: } Q_{BE} = \frac{FC}{P - V} = \frac{2,000,000}{100,000 - 50,000} = 40 \text{ Units}$$

$$\text{New: } Q_{BE} = \frac{2,500,000}{95,000 - 40,000} = 45.45 \text{ Units}$$

**(C)**

Since a higher breakeven point, other things held constant, is more risky. Also the percentage of fixed costs increases

$$OL = FC \div \text{Total Cost}$$

$$\text{OL old} = 2,000,000 \div 4,500,000 = 44.44\%$$

$$\text{OL new} = 2,500,000 \div 5,300,000 = 47.17\%$$

The change in breakeven points and also the higher percentage of fixed costs suggests that the new situation is more risky.

**Example (9-1)**

What is the bond value must be set on the following bond with warrants if the total package is to sell for \$1,000?  $P_0 = \$20$ . , 20-year annual payment bond without warrants = 10%. - 45 warrants with a strike price (also called an exercise price) of \$25 each are attached to bond. Each warrant's value is estimated to be \$3.

**Answer**

$$V_{\text{Package}} = V_{\text{Bond}} + V_{\text{Warrants}} = \$1,000.$$

$$V_{\text{Warrants}} = 45(\$3) = \$135.$$

$$V_{\text{Bond}} + \$135 = \$1,000$$

$$V_{\text{Bond}} = \$865$$

Assume that after the issuing the warrants immediately sell for \$5 each, what would this imply about the value of the package?

$$\text{New value of the package} = \$865 + 45(\$5) = \$1,090.$$

This is \$90 more than the selling price, therefore the company may set lower interest payments who's PV would be smaller by \$90, or it could have offered fewer warrants and/or set a higher strike price

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**Example (9-2)**

Assume the firm's tax rate is 40% and its debt ratio is 50%. Now suppose the firm is considering either:

- (1) Issuing convertibles at rate 8.71%
- (2) Issuing bonds with warrants @ 10%

Its new target capital structure will have 40% straight debt, 40% common equity at cost 13.40 % and 20% convertibles or bonds with warrants. What effect will the two financing alternatives have on the firm's WACC?

**Answer:****WACC with convertible**

Equity		Debt		Convertible
(40% X 13.40%)	+	(40% X 10% X 60%)	+	(20% X 8.71%)
5.36% + 2.40% + 1.74% = 9.50%				

**WACC Without convertible**

Equity		Debt
(50% X 13.40%)	+	(50% X 10% X 60%)
6.70% + 3% = 9.70%		

**(5-1)** Jackson Corporation's bonds have 12 years remaining to maturity. Interest is paid annually, the bonds have a \$1,000 par value, and the coupon interest rate is 8%. The bonds have a yield to maturity of 9%. What is the current market price of these bonds?

$N = 12$        $FV = 1000$       Interest 9%  
 $\text{Coupon} = 1000 * .08 = 80$

$PV = 80 * 7.16073 + 1000 * 0.928.388$

**(5-3)** Heath Foods's bonds have 7 years remaining to maturity. The bonds have a face value of \$1,000 and a yield to maturity of 8%. They pay interest annually and have a 9% coupon rate. What is their current yield?

$N = 7$        $FV = 1000$       Interest 8%  
 $\text{Coupon} = 1000 * .09 = 90$

$PV = 90 * 5.20637 + 1000 * 0.1052.06$   
 $\text{Current } 90/1052.06 = 8.55\%$

**(5-7)** Renfro Rentals has issued bonds that have a 10% coupon rate, payable semiannually. The bonds mature in 8 years, have a face value of \$1,000, and a yield to maturity of 8.5%. What is the price of the bonds?

$N = 8 * 2 = 16$        $FV = 1000$       Interest 4.25%  
 $\text{Coupon} = 1000 * .10 * .5 = 50$

$PV = 50 * 11.44031 + 1000 * 0.51379 = 1085.8055$

**(5-9)** The Garraty Company has two bond issues outstanding. Both bonds pay \$100 annual interest plus \$1,000 at maturity. Bond L has a maturity of 15 years, and Bond S has a maturity of 1 year.

- What will be the value of each of these bonds when the going rate of interest is (1) 5%, (2) 8%, and (3) 12%? Assume that there is only one more interest payment to be made on Bond S.
- Why does the longer-term (15-year) bond fluctuate more when interest rates change than does the shorter-term bond (1 year)?

a.

L:

$N = 15$        $FV = 1000$        $\text{Coupon} = 100$

S:

$N = 1$        $FV = 1000$        $\text{Coupon} = 100$

Interest 5.00%

$PV(L) = 100 * 10.37966 + 1000 * 0.1518.986 = 1518.986$

$PV(S) = 100 * 0.95238 + 1000 * 0.1047.618 = 1047.618$

Interest 8.00%

$$PV(L) = 100 * 8.55948 + 1000 * 0.1171188 = 1171.188$$

$$PV(S) = 100 * 0.92593 + 1000 * 0.1018523 = 1018.523$$

Interest 12.00%

$$PV(L) = 100 * 6.81086 + 1000 * 0.0863786 = 863.786$$

$$PV(S) = 100 * 0.89286 + 1000 * 0.0982146 = 982.146$$

b.

When the RRR Increase Value of the Bond Decreased and as Bond L has a long term maturity so it's decrease will be high

**(5-14)** Current Yield with Semiannual Payments

A bond that matures in 7 years sells for \$1,020. The bond has a face value of \$1,000 and a yield to maturity of 10.5883%. The bond pays coupons semiannually. What is the bond's current yield?

$$N = 14 \quad FV = 1000 \quad PV = 1020 \quad \text{Interest} = 5.2942\%$$

Coupon = ??

$$1020 = \text{Coupon} * 9.71505 + 1000 * 0.48566$$

$$\text{Coupon} = (1020 - 485.66) / 9.71505$$

$$\text{Coupon} = 55.00$$

$$\text{Current yield} = \text{Annual interest} / \text{Current Price} = (55 * 2) / 1020$$

$$\text{Current yield} = 10.78\%$$

10-3

Duggins Veterinary Supplies can issue perpetual preferred stock at a price of \$50 a share with an annual dividend of \$4.50 a share. Ignoring flotation costs, what is the company's cost of preferred stock,  $r_{ps}$ ?

$$R_{ps} = \text{Dividend} / \text{Net Proceed} = (4.5 / 50) * 100 = 9\%$$

10-4

Burnwood Tech plans to issue some \$60 par preferred stock with a 6% dividend. A similar stock is selling on the market for \$70. Burnwood must pay flotation costs of 5% of the issue price. What is the cost of the preferred stock?

$$\text{Dividend} = 60 * 0.06 = 3.6$$

$$\text{Net Proceed} = 70 * 0.95$$

$$\text{Cost of Preferred Stock} = (3.6 / 66.5) * 100 = 5.41\%$$

10-5

Summerdahl Resort's common stock is currently trading at \$36 a share. The stock is expected to pay a dividend of \$3.00 a share at the end of the year ( $D_1 = \$3.00$ ), and the dividend is expected to grow at a constant rate of 5% a year. What is its cost of common equity?

$$D_1 = 3.00 \quad g = 5\%$$

$$\text{Cost of common Stock (Rs)} = ((3 / 36) * 100) + 5 = 8.33 + 5 = 13.33\%$$

10-6

Booher Book Stores has a beta of 0.8. The yield on a 3-month T-bill is 4% and the yield on a 10-year T-bond is 6%. The market risk premium is 5.5%, and the return on an average stock in the market last year was 15%. What is the estimated cost of common equity using the CAPM?

$$\text{Cost of Common Equity} = 6\% + 5.5\% \times 0.8 = 10.4\%$$

10-7

Shi Importer's balance sheet shows \$300 million in debt, \$50 million in preferred stock, and \$250 million in total common equity. Shi's tax rate is 40%,  $r_d = 6\%$ ,  $r_{ps} = 5.8\%$ , and  $r_s = 12\%$ . If Shi has a target capital structure of 30% debt, 5% preferred stock, and 65% common stock, what is its WACC?

$$\text{WACC} = 30\% \times 6\% \times (1 - 40\%) + 5\% \times 5.8\% + 65\% \times 12\% = 9.17\%$$

10-8

David Ortiz Motors has a target capital structure of 40% debt and 60% equity. The yield to maturity on the company's outstanding bonds is 9%, and the company's tax rate is 40%. Ortiz's CFO has calculated the company's WACC as 9.96%. What is the company's cost of equity capital?

$$9.96\% = 40\% \times 9\% \times (1 - 40\%) + 60\% \times \text{Cost of Equity}$$

$$\text{Cost of Equity} = 0.078 / 0.6 = 13\%$$

10-10

The earnings, dividends, and stock price of Shelby Inc. are expected to grow at 7% per year in the future. Shelby's common stock sells for \$23 per share, its last dividend was \$2.00, and the company will pay a dividend of \$2.14 at the end of the current year.

- Using the discounted cash flow approach, what is its cost of equity?
- If the firm's beta is 1.6, the risk-free rate is 9%, and the expected return on the market is 13%, then what would be the firm's cost of equity based on the CAPM approach?
- If the firm's bonds earn a return of 12%, then what would be your estimate of  $r_s$  using the over-own-bond-yield-plus-judgmental-risk-premium approach? (Hint: Use the midpoint of the risk premium range.)
- On the basis of the results of parts a through c, what would be your estimate of Shelby's cost of equity?

a.  $D_0 = 2.00$        $D_1 = 2.14$   
 $\text{Cost of Equity} = (2.14/23) + 7\% = 16.3\%$

b.  $\text{Beta} = 1.60$        $\text{RFR} = 9\%$        $R_m = 13\%$   
 $\text{Cost of Equity} = 9\% + (13\% - 9\%) \times 1.6 = 15.4\%$

c.  $r_s = 12\% + (13\% - 9\%) = 16\%$

- d. The cost of equity should be estimated to be about 15.9 percent, which is the average of the three methods.

10-11

Radon Homes' current EPS is \$6.50. It was \$4.42 five years ago. The company pays out 40% of its earnings as dividends, and the stock sells for \$36.

- Calculate the historical growth rate in earnings. (*Hint:* This is a 5-year growth period.)
- Calculate the *next* expected dividend per share,  $D_1$ . (*Hint:*  $D_0 = 0.4(\$6.50) = \$2.60$ .) Assume that the past growth rate will continue.
- What is Radon Homes' cost of equity,  $r_s$ ?

a.

$$\begin{aligned} \$6.50 &= \$4.42(1+g)^5 \\ g &= 8\% \end{aligned}$$

b.  $D_1 = D_0(1 + g) = \$2.60(1.08) = \$2.81$

c.  $r_s = D_1/P_0 + g = \$2.81/\$36.00 + 8\% = 15.81\%$

10-12

Spencer Supplies' stock is currently selling for \$60 a share. The firm is expected to earn \$5.40 per share this year and to pay a year-end dividend of \$3.60.

- If investors require a 9% return, what rate of growth must be expected for Spencer?
- If Spencer reinvests earnings in projects with average returns equal to the stock's expected rate of return, then what will be next year's EPS? (*Hint:*  $g = \text{ROE} \times \text{Retention ratio}$ .)

a.  $r_s = D_1/P_0 + g$   
 $0.09 = 3.6/60 + g$   
 $g = 3\%$

b. Retained earnings = EPS - Dividends =  $5.4 - 3.6 = 1.8$   
Next year's EPS = Current Year EPS + Increase in Retained earning =  $5.4 + 1.8 * 9\% = \$5.562$

10-13

Messman Manufacturing will issue common stock to the public for \$30. The expected dividend and the growth in dividends are \$3.00 per share and 5%, respectively. If the flotation cost is 10% of the issue's gross proceeds, what is the cost of external equity,  $r_e$ ?

$$\text{Cost of Equity} = 3/(30 \cdot 0.9) + 5\% = 16.11\%$$

TATA is a fast growing company succeed to achieve 21% ROE this year. The financial Data showing that sales figure worth for \$1,000,000, The Company do well by reducing its cost of goods sold to be 50% of sales value. The Financial Manager assumes that TATA has an optimal Capital structure worth for \$ 2Million; divided into (20% Preferred Stock - 50% Long term Debt - 30% Common Stock) TATA is paying 15% Interest on its long term debt. Company decided to distribute 40% of net income (For Both Preferred and Common Stock Holders) and retain the remaining amount to finance new projects.

**Additional Information**

- Tax rate 40%
- RFR 12%
- Beta of TATA= 0.85
- Market Return 17%
- No. of Common Shares = 3000 Shares
- Cost of Preferred Stock = 15% fixed dividends
- TATA has 2 Projects under study (A&B), the below mentioned tables showing the expected Cash Flow and initial investments for each project.

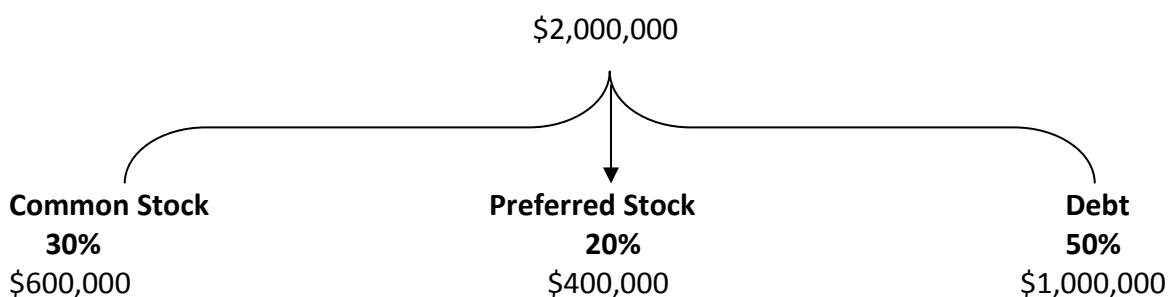
Year	0	1	2	3	4	5	6
Cash Flow (A)	-80,000	16,000	28,000	26,000	24,000	22,000	20,000

Year	0	1	2	3
Cash Flow (B)	-40,000	14,000	26,000	24,000

**From the above mentioned data, kindly Find the Following:-**

1. Required rate of return (RRR )
2. Current Stock Price ( $P_0$ ), what is your decision if stock traded at \$300 in the market?
3. Cost of Common Stock (Hint:  $D_1/P_0 + g$ )
4. Weighted average cost of TATA Capital (Round the result by ignoring fractions)
5. Payback Period for each project
6. Which Project Should TATA choose if they apply NPV Method and why?

Answer:



- ROE = 21%
- $R_m = 17\%$
- RFR = 12%
- Beta = 0.85
- Tax rate = 40%
- No of Common Stocks = 3000 Shares
- $R_{ps} = 15\%$
- $R_d = 15\%$

Sales	1,000,000	
COGS	(500,000)	
<hr/>		
EBIT	500,000	
Int	(150,000)	* 2,000,000 * 50% * 15%
<hr/>		
EBT	350,000	
Tax	(140,000)	* 350,000 * 40%
<hr/>		
Net Income	210,000	
Retention Rate (60%)		
= 210,000 * 60% = 126,000	Pay Out Ratio (40%)	
	= 210,000 * 40% = 84,000	

- Retention Rate (RR) = 60%
- Pay Out to Common Stock = Total Pay Out – Pay Out to Preferred Stock = 84,000 – (400,000 \* 15%) = 24,000

1.  $RRR = RFR + (R_m - RFR) \text{ Beta} = 12\% + (17\% - 12\%) * 0.85 = 16.25\%$

2.  $D_0 = \text{Pay Out to Common Stock} / \text{No of Common Stocks} = 24,000 / 3,000 = \$8$

$g = ROE * RR = 21\% * 60\% = 12.6\%$

$D_1 = D_0 (1+g) = 8 (1 + 0.126) = \$9$

$P_0 = D_1 / (RRR - g) = 9 / (16.25 - 12.6) = \$246.57$

- If stock traded at \$300 then:

- o If I own stocks, I'll sell immediately
- o If I don't have stocks then I'll never buy it.

3. Cost of Common Stock should be 16.25 as calculated before. To double check we can calculate as following: Cost of Common Stock =  $(D_1 / P_0) + g = (9 / 246.57) + 12.6 = 16.25\%$

4.  $WACC = (R_{cs} * W_{cs}) + (R_{ps} * W_{ps}) + (R_d * W_d * (1 - \text{Tax}))$

$WACC = (16.25\% * 30\%) + (15\% * 20\%) + (15\% * 50\% * 60\%)$

$WACC = 4.875\% + 3\% + 4.5\% = 12.375\% = 12\%$  (rounded figure)

5. Project A (Payback Period) = 3 Years 5 Months

Project B (Payback Period) = 2 Years

6.

Cost Of Capital: 12%

Year	Project A	Project B
0	-80,000.00	-40,000.00
1	14,285.71	12,500.00
2	22,321.43	20,727.04
3	18,506.29	-11,388.48
4	15,252.43	8,897.25
5	12,483.39	14,753.10
6	10,132.62	12,159.15
NPV:	12,981.88	17,648.06

Choose Project B as it has the highest NPV

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